

CLAIMS

1) Fuel injector for an internal combustion engine;
the injector (1) comprising a cylindrical body (2),
5 which houses an injection nozzle (4) regulated by an
injection valve (5) provided with a moveable pin (8), a
fuel supply channel (15), an injection chamber (6)
communicating with the fuel supply channel (15), housing
a lower portion of the pin (8) and delimited at the
10 bottom by a valve seat (7) for the injection valve (5),
a control chamber (11) communicating with the fuel
supply channel (15) and housing an upper portion of the
pin (8), and a control valve (19), which is actuated by
an electromagnetic actuator (22) in order to move
15 between a closed position and an open position, in which
it puts the control chamber (11) in communication with
an exhaust conduit (18) for the fuel at low pressure;
the injector (1) being characterised by the fact that
the control valve (19) is a poppet type valve that opens
20 against the pressure of the fluid; an exhaust channel
(17) parallel to the longitudinal axis (3) of the
cylindrical body (2) and housed entirely within the
cylindrical body (2) putting the control chamber (11) in
communication with an exhaust conduit (18) and being
25 regulated by the control valve (19), which comprises a

valve seat (20) produced along the exhaust channel (17),
and a valve body (21) moveable through the exhaust
channel (17) under the thrust of the electromagnetic
actuator device (22), which is housed entirely along the
5 exhaust channel (17).

2) Injector according to Claim 1, in which the
lower portion of the pin (8) housed in the injection
chamber (6) has an element (10) in the shape of a
truncated cone that determines a reduction in the
10 section of said pin (8).

3) Injector according to Claim 1, in which the
upper portion of the pin (8) housed in the control
chamber (11) is coupled to a first spring (12), which
exerts on said pin (8) a force that tends to hold said
15 pin (8) in a closed position of the injection nozzle
(4).

4) Injector according to Claim 3, in which the
upper portion of the pin (8) has a tapered shape with a
change in section that determines a surface (13) in the
20 shape of a circular crown, from the centre of which
rises a cylindrical body (14) having the function
limiting the travel of the pin (8) against an upper
surface of the control chamber (11); the first spring
(12) being arranged around the cylindrical body (14) so
25 as to be compressed between the surface (13) in the

shape of a circular crown and the upper surface of the control chamber (11).

5) Injector according to Claim 1, in which the injection chamber (6) is fed directly from the supply channel (15); another supply channel (16) being provided, which branches off from the supply channel (15), is capable of putting the supply channel (15) in communication with the control chamber (11).

6) Injector according to Claim 5, in which the supply channel (15) has a throttled area (33), which is arranged downstream from the branching off of the other supply channel (16).

7) Injector according to Claim 1, in which the valve seat (20) of the control valve (19) is defined by a surface in the shape of a truncated cone determining a narrowing of the exhaust channel (17); the valve body (21) of the control valve (19) being defined by a spherical body, which is capable of being coupled in a fluid-tight manner with the valve seat (20) by the action of the actuator device (22).

8) Injector according to Claim 7, in which the actuator device (22) comprises a second spring (24), which acts directly on the valve body (21) in order to keep said valve body (21) in a closed position of the exhaust channel (17).

9) Injector according to Claim 8, in which the second spring (24) is defined by a ring, which has a configuration in the shape of a truncated cone in order to allow elastic axial deformation.

5 10) Injector according to Claim 8, in which the actuator device (22) comprises a stem (25), which by means of a third spring (26) is held constantly bearing against the valve body (21) from the opposite side with respect to the second spring (24)

10 11) Injector according to Claim 10, in which the force exerted on the valve body (21) of the third spring (26) is greater than the force exerted on the valve body (21) by the second spring (24) in such a way that the control valve (19) is opened when the injector (1) is in
15 the rest condition.

12) Injector according to Claim 8, in which the actuator device (22) comprises a stem (25) that bears against another stem (34), which on the one hand is held pressed against the stem (25) by a fourth spring (35)
20 and on the other hand bears against the valve body (21).

13) Injector according to Claim 12, in which the other stem (34) has dimensions so as to be separated from the valve body (21) by a given distance when the actuator device (22) is de-excited.

25 14) Injector according to Claim 1, in which the

actuator device (22) comprises a stem (25) that is capable of moving the valve body (21) and is subdivided into two truncated cones (25a, 25b) aligned with each other and each of which is integral with a respective
5 anchor (27) of ferromagnetic material coupled to a respective electromagnet (28) provided with a coil (29) and a magnetic nucleus (30).